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authors regard the oxygenation of the perivisceral fluid as taking place through the thin integument covering the scale tubercles and the tubercles at the bases of the dorsal cirri, and having observed the scales to be subject to rhythmical movements by means of which a current of water is driven continually over the dorsal surface, thus renewing the water in contact with the "branchiæ." In species in which the felt-like dorsal covering does not exist, this function would appear to be in abeyance; and in *Polynoë* and allied genera, so far as Mr. Haswell has observed, the elytra remain perfectly motionless, while the animal as a whole is at rest.

The sexual products reach the exterior through apertures in the bases of the parapodia; and the ova are carried by ciliary action to the under surface of the scales, where they remain, adhering by means of a viscid matter till the embryos are well advanced. Impregnation probably takes place while the eggs are in this situation.—*Journal of Royal Microscopical Society.*

PSYCHOLOGY.

MATERNAL ANXIETY IN A HORNED TOAD.—I cannot designate the species of *Phrynosoma*, to which reference is here made, but my informant, to whom I showed several engravings, thinks it is *P. cornutum*. The following, which I am led to communicate with complete confidence in its truthfulness, I have taken from a friend, an educated lawyer: A full statement from him has been made to me several times, at intervals of some months. I made notes, and find my communicant agreeing closely in his facts every time. Hence I give the following as the pith of his statements:

It was near the South Platte cañon, where the foot hills reach the plains, on an afternoon in May, 1880. I was walking along a disused lumber road, when my attention was drawn to the strange movements of a horned toad. Instead of running away from me, I soon saw that it was making painful efforts to screen a young one from my observation. I was deeply impressed with the fact that it was a mother solicitous to save her little one from danger. The young one acted wildly, and aimlessly; and in manifest distress the mother would interpose herself between it and me, occasionally with a sidling motion against the young one, she would give its movements a direction of her own. In this way she got the little thing into a depression in the soil, where it squatted. I made no motion, but simply watched. But now, suddenly, the mother changed her conduct, which in fact became actually tactical, for she now tried to decoy me to herself, by making a short, rapid run at right angles to the line which I was taking. Then she stopped, and looked back. She would retrace a little distance of her flight, then turn again, and make another spurt of a run. I am positive that she was doing all this to with-

draw my attention from her little one. The mother was full grown, and the young one, I should think, was about one-third of her size.

So it seems this tiny cousin of the Iguanas has attractive psychic qualities, and so bird-like, too. But then if the bird heirs from the lizard, it should be an estate of body and of mind. But though a likeness in kind, how vastly superior to the inheritance in degree.—*S. Lockwood.*

BUFO AMERICANUS AT PLAY.—Except in the love season, so hermit-like is the common toad that I never suspect it of having a spark of frivolity or fun in its make up. It has seemed to me as the personification of a stupid stolidity. It catches insects. But should the bug play opossum, Bufo would be completely humbugged, for however hungry, it would not touch it. Bufo's eyes are everything. I do not think it can smell. If there is motion then it makes for the object. The glow-worm and fire-fly or lightning bug attract it. I knew an ignorant fellow who had his own fun with toads at night. He would burn a match, then break off the red-hot end, and throw it in sight of Bufo, who would gobble it up instant, and a second one, if offered quick enough would disappear, about which time Bufo would wake up to the idea of a difference between fire-bugs and fire-brands, and that his host's entertainment was too warm to be wholesome. On one occasion I saw a very large Bufo under a gooseberry bush, whose shade sheltered him from the heat of the summer sun. I plucked some of the ripe fruit, and having sucked out the pulp I threw the sour rind so that it fell about an inch in front of the toad, making a slight rebound. Some folks have a proverb—"Where there's smoke there's fire." The Batrachian holds to a similar conceit—"Where there's motion there's life." The gooseberry husk disappeared in a trice. I threw another. Down it went, too—and a third, when the big goggle eyes seemed serious, as if looking into the matter. In vain I tried it again—Bufo had learned wisdom by experience.

Every one knows how a dog will play with a stick, and a kitten with a ball. Under the seat, where we resorted of an evening last summer, an old toad had his form or resting place. Into this damp spot his back parts were pushed, and from it his grave, golden eyes could watch while he waited for the cool of the evening. One evening he came out hopping as was his wont. A bit of dead twig had fallen from the tree overhead. Did he see it fall? I cannot say. But this is what was witnessed by more than one. He took up that twig in his mouth, and sat on his hind legs like a rodent. The toothless fellow could not bite the stick, but he did go through a queer performance with it between his big lips, his long-fingered hands upon it, as if he was improvising a flute. It was a comical sight. It is evident that the creature was playing with it. The whole thing was quite deliberate. Perhaps it occu-

pied two minutes—a long time for Bufo to keep his mind on so abstract a subject. He dropped the stick, hopped away several feet, then turned round, came back and went through the same performance again, in exactly the same way. He had now had his play out, and left for the lawn, bent on the more sober pursuit of getting his livelihood.

A toad may be made to learn. A friend at whose house was a basement, had several toads in the area. Towards evening they came out with much regularity to feed. It did seem that they knew her voice. They certainly had learned not to fear her presence. Whether they distinguished her from others I do not know—comparative or experimental observations are usually confined to naturalists. The observable fact is this: These toads had been taught reliance upon their benefactors. It was indeed beautifully said:

—“The toad, ugly and venomous,
Wears yet a precious jewel in his head.”

I claim to have found “the toad-stone.” The gem is psychic—a modicum of educability in Bufo’s brain.—*S. Lockwood.*

INTELLIGENCE IN THE ELEPHANT.—The following little incident is related as illustrating to what a remarkable extent the reasoning powers of the elephant may be brought out, as well as showing the control experienced animal-trainers have over these huge brutes. A medium-sized Asiatic male elephant with the P. T. Barnum and London Shows has been taught to perform the following: Dressed as a German, with a cap perched on his head, he is brought into the ring, and mounting a strong barrel he rolls it backward and forward with his four feet. He then takes a chair, sits on it before a table upon which is placed a bell, rings the bell, orders dinner, eats it, drinks out of a bottle, wipes his mouth with a big napkin, fans himself with a palm-leaf fan, stands on his hind legs, his fore legs, on his head, lies down, sits down upon the ground, rolls over, gets up, holds his trainer on his head, goes forward, backward, sideways, see-saws on a plank, plays an organ, walks on bottles arranged in a row, carries different articles, takes off his clothes with his trunk, rolls a tub with his nose, sets it on end, sits on it, and many other funny things, closing by pushing his trainer out of the ring. All this is done without a word being spoken to him.—*Exchange.*

A STORY OF A DOG.—Sometime during the past winter I accidentally learned the story of a black-and-tan terrier which seemed to me so noteworthy that I have been at considerable pains to authenticate it. I have now received the following details from the owner of the dog—Mr. W. S. Granger, of Providence, R. I.:

“At Christmas, 1880, our family all went to Newport to spend

a few days with a relative, Capt. Pitman, and Ponto being a member of the family, we took him along, going by rail, and landing at one end of the city. Capt. Pitman was then living near Elm and Washington streets, and Ponto remained there a week, but did not go around the city, and returned home by the same way that we went. The following summer Capt. Pitman having left Newport, his father was accustomed to take Ponto occasionally to Silver Spring (about twelve miles from Providence). One day arriving at the boat just as it was leaving, he jumped aboard and left the dog behind. The Newport boat left a few minutes later, and upon this Ponto jumped, and the boat making no landings, went on to Newport. Here he disembarked at the other end of the city, where he had never been, and from thence found his way to Capt. Pitman's former residence. The new occupants tried to turn him away, but he was bound to remain and make himself at home, which he did until the lady, who was then occupying the house, could write to Providence, when we sent for him. Now, how he could have found his way to the house in the short space of time, and after six months time, and never having been to the steamboat landing, I cannot tell. When first there, there had been quite a fall of snow and good sleighing, so that the whole appearance of the city was changed from his first to his second visit."—*W. W. Bailey.*

THE MOCKING BIRD.—I have two mocking birds, *Mimus polyglottus*, taken from their nest in Concord, N. C., two years ago. They are marvelous singers, but my observations of them have been quite different from those of people generally, possibly because they have been petted more than usual. For the first few weeks, perhaps two months, we were very careful to feed them only mashed boiled potato and hard-boiled egg, well mixed, plenty of fresh water and what spiders and flies came in our way. We soon found they thrived much better to be fed by hand than when feeding themselves, and enjoyed greatly their outing in the sitting-room. One day, by accident, one escaped out of doors, and though usually very tame, his new surroundings rendered him quite unwilling to be caught. A close watch was kept of his whereabouts, and of anything he might do. Becoming hungry, but too much frightened to recognize the outside of his home, he finally flew into a neighbor's yard, and caught up a bit of cucumber pickle shaken from the table-cloth, and began *eating it vigorously*. When he was finally caught, and needed feeding, we did not hesitate to give him, and soon after the other also, anything which they would eat. When we put anything into their mouths which they did not like, even though it had been swallowed, they would eject it. The final result has been that the last eighteen months we have prepared nothing expressly for them, giving them whatever comes upon the ordinary family table. For cooked beef they manifest a greater fondness, whether fresh or corned, than any other meat,

and though fond of raw steak, it does not seem to assimilate nearly as well. Of course meal-worms, spiders and flies are always their preference, and to these they will help themselves freely, though this arises I think largely from their exhibiting life. Generally when hungry they stand with open mouths calling loudly for us to feed them. Besides beef, pork and veal as meats (mutton they dislike), their chief diet has been crackers and cookies, though the latest development is a love for corn and oatmeals when not ground too fine. For fruits in general they do not care particularly. They sing incessantly during the late winter, spring and summer, but are more silent, though not wholly so, during the molting period. By their side hangs a pet robin which sings constantly also, but our closest observation has failed to recognize from these "mockers" the first note closely imitating that of the robin, though they hear it so constantly, whilst other sounds, as peeping of chickens, mewing of a cat, snarling of puppies, filing a saw, and various bird notes, which they neither of them have heard, as the cage always hangs in the dining-room, constitute their chief delight. This has led me to inquire whether they *intentionally* produce any of these special sounds, or whether it is simply *their method* of singing. I do not question but that in some instances they may be *taught* to follow strains of music, but do they ever adopt it *themselves*? For persons our birds manifest strong preferences, but they do not seem to have a particularly well-developed memory, and are rather easily alarmed by any strange appearance. A few weeks since a strange lady, dressed in rather gay colors, undertook to touch one of them as he sat on my hand, when he was so alarmed that unable to fly, he dropped every tail feather, and stood transfixed for a moment till she withdrew.—*Mary E. Holmes.*

MASKING OF CRABS.—It is a matter of common observation that certain species of sea-coast crabs are during the greater portion of their existence covered with a superficial growth of foreign organisms, such as algæ, sponges, polyps and tunicates, which likewise cover inert bodies, and which were consequently supposed to find their way to the carapace of the animal in question as a result of pure accident. Dr. Graeffe, inspector of the Zoölogical station at Trieste, finds that this is not the case, however; that, instead of chance governing the location of these would-be parasites on the carapace of the crab, their presence there is due solely to the intelligent action of the animal supporting them, who, it would appear, intentionally places them in position with the feet, and for the sole effect of concealing itself from the gaze of its enemies. The selection for the covering, moreover, consists of such forms as most strictly partake in their coloring with the colors of the surrounding objects, and consequently of such as will be least liable to attract attention. Singularly enough, the species of crab thus disguising themselves are provided on the

back with a peculiar growth of hooked bristles, which tend to secure the objects placed there, and to retain them until they shall have become firmly united or rooted to the mass. The crab is seemingly aware of the fact that detached or lacerated portions of polyps and sponges are capable of further growth and development.—*American*.

ANTHROPOLOGY.¹

AMERICAN HERO MYTHS.—Dr. Daniel G. Brinton is the author of a new work on American hero myths, published in Philadelphia by H. C. Watts & Co. Although professing to deal with the great heroes, Michabo, Ioskeha, Quetzalcoatl and Tezcatlipoca, Itzamina, Kukulcan, Viracocha, Votan, Gucumatz, Bochico, &c., the work has a wider scope and includes the whole question of comparative mythology as applied to American aborigines. Dr. Brinton is a pleasant, courteous writer, very rarely discharging a bomb-shell of innuendo or abuse.

The introductory chapter boldly states the author's views, the fundamental terms of the discussion are defined, and the groundwork on which myths are built up, clearly stated. "At the foundation of all myths lies the mental process of personification, favored by the American languages, through the grammatical distinction between animate and inanimate." *Paronymy, homonymy, polynomy, henotheism* and especially *otosis* have greatly fostered the process. The author's charming story concerning the Nickajak cave at Chattanooga, certainly would justify the appellation of the Nigger-Jack-theory to his method of explaining American hero myths.

The religions of America were tribal, with no aspirations to universality. Among them the most prominent character is that of a national hero, their mythical teacher and civilizer, often identified with the supreme deity and creator, who appeared among the ancestors of the tribe, gave them precious advice and gifts and disappeared, leaving hopes of his return. As a rule, each is a twin, or one of four brothers born at one birth, generally at the cost of the mother's life, who is a virgin, or at least not impregnated by man. The hero struggles with his brother, or one of his brothers, often involving the universe in repeated destructions.

In the words of Dr. Brinton: "All of these myths are transparent stories of a simple people to express in intelligible terms the daily struggle that is ever going on between day and night, between light and darkness, between storm and sunshine." This thought is brought out from page to page in a series of charming surprises which carries the reader's attention onward to the end of the book.

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